Plasma Processes, Inc.

Robust, High Temperature Containment Cartridges for Microgravity

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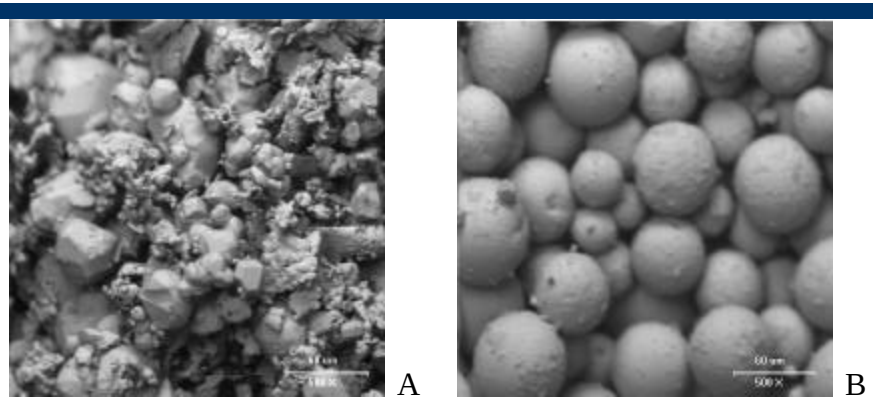
Proposal No.: B1.02-8508

Description and Objectives

•W-Re and Mo-Re alloys possess the high temperature properties and corrosion resistance needed for ? gravity processing

•Problems with distortion, intermetallic formation and incomplete alloying have occurred when making cartridges from elemental blended powders.

•An innovative Plasma Alloying and Spheroidization (PAS) process is being developed to produce pre-alloyed Mo-Re and W-Re powders.



A B

Figure 1 - SEM backscattered images showing A) as-received W-25Re versus B) PAS W-25Re

Approach

•Benefits of the PAS process such as a two-order magnitude reduction in oxygen contamination, enhanced flow characteristics, ability to produce pre-alloyed refractory metal powders and to reduce post-spray processing time were demonstrated during Phase I.

•During Phase II, the PAS process will be optimized.

•Optimized PAS Mo-Re and W-Re powders will be used for the production of QMI and GEDS cartridges and commercial applications.

Subcontractor

University of Central Florida

Schedule and Deliverables

- 24 months
- Robust, high temperature W-Re and Mo-Re containment cartridges with pure W liners for QMI and GEDS.

NASA and Commercial Applications

- Containment cartridges for ? gravity
- Potential for the development of a containment cartridge that can used to ~2500°C.
- Multi-billion dollar coatings and powder industries markets, rocket motors, heat pipes, power generation, furnaces